Current Data Hawks References

[1] Kim, S., Park, E. Prediction of flight departure delays caused by weather conditions adopting data-driven approaches. J Big Data 11, 11 (2024).

- This paper uses weather underground for weather data.

[2] Goodman, C. J., and J. D. Small Griswold, 2019: Meteorological Impacts on Commercial Aviation Delays and Cancellations in the Continental United States. J. Appl. Meteor. Climatol., 58, 479–494, https://doi.org/10.1175/JAMC-D-17-0277.1.

- This work utilizes raw meteorological aviation routine weather reports (METARs) for the period October 2003 to July 2015.
    - METARs are hourly or half-hourly surface weather observations that provide important information for the planning of safe and efficient aviation operations.

[3] Kiliç, K.; Sallan, J.M. Study of Delay Prediction in the US Airport Network. Aerospace 2023, 10, 342. https://doi.org/10.3390/aerospace10040342

- Bureau of Transport Statistics for flight data
- This study used NOAA for weather data

[4] M. Schultz, S. Reitmann and S. Alam, "Classification of Weather Impacts on Airport Operations," 2019 Winter Simulation Conference (WSC), National Harbor, MD, USA, 2019, pp. 500-511, doi: 10.1109/WSC40007.2019.9004915.
keywords: {Airports;Delays;Aircraft;Wind;Machine learning;Europe},

- METAR data used for weather - 30 min intervals
- https://aviationweather.gov/data/metar/

[5] Carlier, S., I. de Lepinay, J. Hustache, and F. Jelinek. 2007. “Environmental Impact of Air Traffic Flow Management Delays”.
In 7th USA/Europe Air Traffic Management Research and Development Seminar (ATM2007)

[6] H. Khaksar; A. Sheikholeslami. "Airline delay prediction by machine learning algorithms". Scientia Iranica, 26, 5, 2019, 2689-2702. doi: 10.24200/sci.2017.20020

- Data on the US flight network and the weather conditions were obtained from [11] and [36]

[7] Hsu et al. “Unraveling Extreme Weather Impacts on Air Transportation and Passenger Delays using Location-based Data.”

- This paper explores the most disrupted airports from a passenger-delay perspective, the extent to which airports are affected by direct hazard exposure versus cascading

impacts, and the extent to which operating models affect vulnerability. Examines delays from a passenger “dwell time” perspective, rather than delayed time versus scheduled time.

- In a winter storm from Dec 21 to Dec 26 2021 versus 2022, there was a 11,970,665 hour and 4 minute increase in aggregated total dwell time. Travel time savings for personal travel by air is estimated to be $36.1 per hours, the winter storm could cause a $1.6 billion to $2.7 billion loss.
- Provides a list of the most vulnerable airports

[8] Yhdego et al. “Analyzing the Impacts of Inbound Flight Delay Trends on Departure Delays Due to Connection Passengers Using a Hybrid RNN Model.” *Mathematics* 2023, *11*, 2427.

- If inbound aircraft experiences a delay, subsequent outbound flights could be delayed and have a potential to spread through the airline network, causing longer delays and increased costs. The annual economic impact of airline delays was estimated to be $31.2 billion in 2010, other estimates said $40.2 billion. Each minute of primary delay generates ⅔ min of reactionary delay. Total cost of the flight can range from 59 to 85 euros for each minute of primary delay.
- Their model integrates a gated recurrent unit (GRU, neural network) to capture historical trends to capture dependency between arrival and departure delays

[9] Choi et al. “Prediction of Weather-induced Airline Delays Based on Machine Learning Algorithms.” 2016 IEEE/AIAA 35th Digital Avionics Systems Conference (DASC), Digital Avionics Systems Conference (DASC), 2016 IEEE/AIAA 35th.

- Uses data mining and supervised machine learning algorithms to predict airline delays caused by inclement weather conditions. Used decision trees, random forest, the AdaBoost, and the k-Nearest Neighbour approach. Trained the model to perform a binary classification to predict if its delayed or on-time. Their highest accuracy percentage was 80.36% using the random forest classifier.

[10] Gratton, G. B. et al. “Reviewing the Impacts of Climate Change on Air Transport Operations.” The Aeronautical Journal 126.1295 (2022): 209–221. Web.

- Discusses how aircrafts are directly impacted by changes to the troposphere and lower stratosphere. The changes include horizontal spatial aptters, vertical distribution of temperature and pressure, density changes, wind strength and direction, weather characteristics, turbulence, humidity
- The weather characteristics they discuss: near-surface temperatures, near-surface winds, the combined effects of the previous two, en-route winds, behavior of jet streams and clear-air turbulence, lower stratosphere, surface impact,
- “As air travel demand grows and adverse weather conditions become more frequent due to climate change, the ability to accurately predict and manage these disruptions is increasingly crucial.”